

THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of: Lean et al.

Application No.: 10/612,122

Examiner: Hageman

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XERZ 200594

For: SYSTEM FOR TRANSPORTING AND SELECTIVELY SORTING  
PARTICLES AND METHOD OF USING THE SAME

BRIEF ON APPEAL

Appeal from Group 3653

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is Xerox Corporation, by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 014302, Frame 0458.

II. RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellants, Appellants' representative, or the Assignee, that may be related to, or which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-3, 9-11, 19-23, 25-27, 33-36 are on appeal.

Claims 1-3, 9-11, 19-23, 25-27, 33-36 are pending.

Claims 1-3, 9-11, 19-23, 25-27, 33-36 are rejected.

Claims 28-32 are withdrawn from consideration.

Claims 4-8,12-18, 24 are canceled.

IV. STATUS OF AMENDMENTS

An Amendment After Final Rejection was filed on September 25, 2006. By an Advisory Action dated October 11, 2006, it was indicated that the request for reconsideration did not place the application in condition for allowance.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention of claim 1 is directed to a system for transporting and selectively sorting particles comprising a first wall and a traveling wave grid extending along the

first wall (Paragraph Nos. 0010, 0047, FIG.1).<sup>1</sup> The system also comprises a second wall having a passage extending therethrough (Paragraph Nos. 0010, 0047). The passage has a first end and a second end (Paragraph Nos. 0010, 0047). The system also comprises a gate operatively associated with the passage (Paragraph Nos. 0010, 0047). The gate includes a first electrode proximate the first end and a second electrode proximate the second end (Paragraph Nos. 0010 0047, 0067, FIGs. 1, 6, 8, 10-10c). The system also comprises a controller adapted to output a multi-phase electrical signal and in electrical communication with the traveling wave grid and the first and second electrodes of the gate (Paragraph Nos. 0010, 0097). The controller provides a first voltage to the first electrode and a second opposite voltage to the second electrode (Paragraph Nos. 0010, 0047, 0072-0077, FIGs. 10-12).

The invention of claim 2 is directed to the system of claim 1 wherein the passage is comprised of a collection of apertures extending through the second wall (Paragraph Nos. 0047, 0057-0058, 0064).

The invention of claim 3 is directed to the system of claim 2 wherein the collection of apertures are substantially cylindrical and have a diameter of from about 10 micrometers to about 250 micrometers ((Paragraph No. 0058).

The invention of claim 9 is directed to the system of claim 1 wherein the traveling wave grid is a first traveling wave grid and the system further comprises a second traveling wave grid extending along the second wall (Paragraph No. 0057, FIG. 6).

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<sup>1</sup> Support for the recited features is found throughout the present application including its claims and drawings, as originally filed. Paragraphs and figures particularly supporting each claimed feature are identified in parentheses above.

The invention of claim 10 is directed to the system of claim 1 wherein the first wall is substantially cylindrical ((Paragraph No. 0062, FIGs. 8-9).

The invention of claim 11 is directed to a system for transporting and selectively sorting particles comprising a housing having a first wall at least partially defining a first transport channel, a second wall at least partially defining a second transport channel, and a gating passage extending in fluid communication between the first and second transport channels (Paragraph No. 0057, FIG. 6). The system also comprises a traveling wave grid disposed along the first wall ((Paragraph No. 0057). The system further comprises a gate operatively associated with the gating passage (Paragraph No. 0058). The gate includes a first electrode proximate the first transport channel and a second electrode proximate the second transport channel (Paragraph No. 0058). The system further comprises a voltage source adapted to output a multi-phase voltage signal and in electrical communication with the traveling wave grid and the first and second electrodes of the gate (Paragraph No. 0059).

The invention of claim 19 is directed to the system of claim 11 wherein the traveling wave grid includes four conductor groups (Paragraph Nos. 0049, 0050, FIG. 3). Each conductor group has a collection of conductors (Paragraph No. 0050). The conductor groups are disposed in an inter-digitized pattern(Paragraph No. 0050).

The invention of claim 20 is directed to the system of claim 19 wherein the voltage source outputs a four phase voltage signal (Paragraph No. 0049). Each of the four phases is applied to a different one of the conductor groups (Paragraph No. 0049).

The invention of claim 21 is directed to the system of claim 11 wherein the traveling wave grid is a first traveling wave grid and the gating passage is a first gating passage (Paragraph No. 0057. FIG. 6). The housing further includes a third wall at

least partially defining a third transport channel and a second gating passage extending in fluid communication between the second and the third transport channels (Paragraph No. 0057). The system further includes a second traveling wave grid extending along the second wall (Paragraph No. 0057).

The invention of claim 22 is directed to the system of claim 21 wherein the gate is a first gate ((Paragraph No. 0058, FIG. 6). The system further includes a second gate operatively associated with the second gating passage ((Paragraph No. 0058)).

The invention of claim 23 is directed to a method of transporting and selectively sorting particles (Paragraph Nos. 0053-0056, 0060-0061). The method comprises the steps of providing a first wall that at least partially forms a first chamber, a second wall at least partially forming a second chamber, a passage wall at least partially defining a passage extending in fluid communication between the first and second chambers, a traveling wave grid disposed along the first wall, a gate operatively associated with the passage, the gate including first and second spaced apart electrodes disposed along the passage, and a controller adapted to selectively output a multi-phase electrical signal and in electrical communication with the traveling wave grid and the gate (Paragraph Nos. 0010, 0047, FIG. 1, 0057, FIG. 6, 0062, FIGs. 8-9). The method also comprises introducing a quantity of separable particles into the first chamber (Paragraph Nos. 0053, 0060, 0065). The method further comprises applying a multi-phase electrical signal from the controller across at least a portion of the traveling wave grid thereby inducing flow of the quantity of separable particles along the first chamber (Paragraph Nos. 0054, 0061, 0066). The method also comprises selectively gating a portion of the quantity of separable particles flowing along the first chamber into the second chamber by the controller outputting an electrical signal having first and second

phases, and applying the first phase to the first electrode of the gate and applying the second phase to the second electrode of the gate (Paragraph Nos. 0056, 0061, 0067-0075, FIGs. 11-15, 0077, FIGs. 12-15).

The invention of claim 25 is directed to the method of claim 23 wherein the step of providing includes providing a continuous particle supply apparatus in fluid communication with the first chamber (Paragraph Nos. 0062, FIGs. 8-9, 0065). And, the step of introducing a quantity of separable particles includes introducing a continuous quantity of separable particles from the supply apparatus (Paragraph Nos. 0062, 0065).

The invention of claim 26 is directed to the system of claim 1 wherein the first voltage is a positive voltage and the second voltage is a negative voltage (Paragraph No. 0073).

The invention of claim 27 is directed to the system of claim 1 wherein the first and second voltages are 180 degrees out of phase (Paragraph No. 0073, FIG. 11).

The invention of claim 33 is directed to a system for transporting and selectively sorting particles comprising a housing having a first wall at least partially defining a first transport channel, a second wall at least partially defining a second transport channel, and a gating passage extending in fluid communication between the first and second transport channels (Paragraph Nos. 0062-0066, FIGs. 8-9). The system also comprises a first traveling wave grid disposed along the first wall (Paragraph Nos. 0062, 0063). The system also comprises a gate operatively associated with the gating passage (Paragraph Nos. 0064, 0067, FIGs. 10-10c). The system further comprises a continuous particle supply apparatus in fluid communication with the first transport channel (Paragraph No. 0062). The supply apparatus includes a supply housing at

least partially defining a supply chamber (Paragraph No. 0062), and a second traveling wave grid disposed within the supply chamber. The system further comprises a voltage source adapted to output a multi-phase voltage signal and in electrical communication with the first and second traveling wave grid and the gate (Paragraph No. 0064).

The invention of claim 34 is directed to the system of claim 33 wherein the supply apparatus further includes a support wall supported within the supply chamber and the second traveling wave grid extends along at least a portion of the support wall (Paragraph Nos. 0062-0066, FIGSs. 8-9).

The invention of claim 35 is directed to the system of claim 34 wherein the support wall is generally cylindrical (Paragraph Nos. 0062-0066, FIGs. 8-9).

The invention of claim 36 is directed to the system of claim 33 wherein the gating passage is a first gating passage. The supply apparatus is in fluid communication with the first transport channel through a second gating passage extending between the supply chamber and the first transport channel (Paragraph Nos. 0062-0066, FIGs. 8-9).

#### VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review:

Claims 1-3, 9-11,19-20, 23, 25-27 and 33-36 were rejected under 35 USC §102(b) for allegedly being anticipated by U.S. Patent 5,824,389 to Rostoker.

Claims 3 and 9 were rejected under 35 USC §103(a) for allegedly being obvious over the '389 patent to Rostoker.

Claims 21 and 22 were rejected under §103(a) for alleged obviousness over Rostoker in view of U.S. Patent 5,626,734 to Docoslis et al.

## VII. ARGUMENT

The rejected claims are directed to systems and methods for transporting and selectively sorting particles. The systems and methods employ electrostatic traveling waves, electrode-based gates, and the use of particular voltage configurations that are applied to the electrodes of a gate. As explained herein, the cited prior art fails to either anticipate or teach the subject matter of the pending claims.

### A. Rejection of Claims 1-3, 9-11, 19-20, 23, 25-27 and 33-36 Under §102(b) Must Be Reversed

#### 1. Rostoker Fails to Disclose the Bipolar Voltage Configuration of Claims 1-3, 9-10, and 26-27

Independent claim 1 recites a system for transporting and selectively sorting particles. Claim 1 recites the system as comprising, in part, a first wall and a traveling wave grid, a second wall and an associated passage, gate and electrodes, and controller. Claim 1 recites that the gate includes two electrodes, each positioned at ends of a passage defined in the second wall. This configuration is shown in Figs. 1, 6, 8, and in particular, Figs. 10, 10A, 10B, and 10C of the present application. Claim 1 further recites that the controller provides a first voltage to the first electrode and a second, opposite voltage to the second electrode of the gate. This "bipolar voltage" approach is illustrated in Fig. 11 and described in paragraphs 0073-0077 of the present application.

The '389 patent to Rostoker fails to disclose the subject matter of claim 1, and specifically, the provision of first and second opposite voltages to the gate electrodes. The Board is respectfully reminded of the proper standard to be applied under §102. "Anticipation under 35 U.S.C. §102 requires that a single prior art reference disclose each and every limitation of the claimed invention." *Moba, B.V. v. Diamond*

*Automation, Inc.*, 325 F.3d 1306, 66 USPQ2d 1429 (Fed. Cir. 2003). "Anticipation under Section 102 can be found only if a reference shows exactly what is claimed." *Titanium Metals Cop. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). Rostoker fails to disclose a system for transporting and selectively sorting particles comprising a gate having two electrodes spaced from one another, to which are applied, two opposite voltages, i.e. the bipolar voltage approach. Rostoker fails to disclose "each and every limitation of the claimed invention." Rostoker fails to show "exactly what is claimed."

The most that Rostoker discloses in this regard are tubes such as shown in Figs. 1a, 1b, and 3a that may contain a series of conductive rings along their periphery to which a series of successive voltages may be applied. The only configuration arguably similar to the recited gate of claim 1 is that depicted in Figs. 6a-6c of Rostoker. However, as evident from a close reading of the '389 patent, and particularly col. 9, line 4 to col. 10, line 11; concurrently applied opposite voltages are not applied to conductors at opposing ends of the apertures, e.g. in Fig. 6a, conductors 610 and 612 of aperture 630.

Instead, Rostoker applies a single "accelerating potential" or a single "repelling potential" to conductive regions surrounding multiple apertures, within the same plane. For instance, Rostoker describes selecting one of the six apertures in Fig. 6b for receiving particles and then applying an accelerating potential to the square shaped electrode surrounding that aperture. Other repelling potentials can be applied to the square shaped electrodes of the non-selected apertures. See col. 9, lines 19-43 of the '389 patent. This is very different than the configuration recited in claim 1.

Again, Rostoker fails to disclose a configuration in which opposite voltages are concurrently applied to spaced apart electrodes of a gate, i.e. the "bipolar voltage" approach described in the present application.

In support of the rejection based upon the '389 patent to Rostoker, the Examiner asserted:

The reference [the '389 patent] teaches the use of traveling waves to move particles. With regards to Fig. 6A, the reference states that a "particle near the aperture 630 can be accelerated (caused to move) through the aperture by application of appropriate accelerating potentials to the two conductive layers 610 and 612." The teaching of appropriate accelerating potentials – cyclical out of phase voltages applied to the electrodes – is set forth in the reference (col. 4, lines 50+).

Page 8 of the final Office Action mailed August 15, 2006.

The Examiner relies upon Fig. 6A of the '389 patent to Rostoker. In regards to that figure, Rostoker states:

An electrostatically charged particle near the aperture 630 can be accelerated (caused to move) through the aperture 630 by application of appropriate accelerating potentials to the two conductive layers 610 and 612.

Col. 9, lines 10-15.

This passage of "appropriate accelerating potentials" fails to disclose the use of the claimed "bipolar voltage" strategy in which two opposite voltages are applied to two electrodes. The mere mention of applying "appropriate accelerating potentials" to two conductive layers does not disclose the application of two opposite voltages to two separate gate electrodes, and indisputably fails to anticipate that claimed feature.

The Examiner points to col. 4, lines 50+ in the '389 patent for allegedly disclosing this aspect of "appropriate accelerating potentials." However, Appellants have carefully studied the cited passage and are unable to discern the Examiner's claim.

In point of fact, the cited passage in col. 4, lines 50+ is not with regard to the aperture of Fig. 6a in the '389 patent to Rostoker. Instead, that passage describes various waveforms that Rostoker uses in the tubular conveyor of Fig. 1a:

A waveform generator provides a plurality (in this case, three, but more or less can be appropriate) of driving voltages on a like plurality of lines 132a, 132b, and 132c to selected ones of the ring-like conductors 120. The voltages are cyclic in nature and are offset from one another in phase. For example, sinusoidal voltage waveform is provided on a first line 132a at a reference phase of 0°. A second sinusoidal voltage waveform is provided on a second line 132b advanced in phase 120° relative to the voltage waveform on the first line 132a. A third sinusoidal voltage waveform is provided on a third line 132c advanced in phase 240° relative to the waveform on the first line 132a. Preferably, the number of waveforms generated by the waveform generator is greater than or equal to three (the number of separate conductor sets), and the waveforms are spaced at even phase intervals about one full cycle (i.e., four sinusoidal waveforms could be provided at 90° intervals, five waveforms at 72°, etc.). The waveforms need not necessarily be sinusoidal. The waveforms can be square waves, pulse waves, triangular waves, etc.

Col. 4, line 50 to col. 5, line 3.

Rostoker does not state that any of the above-quoted descriptions are examples of "appropriate accelerating potentials." Nor does Rostoker disclose that these examples of voltage waveforms may be used in conjunction with the apparatus depicted in Fig. 6a of the Rostoker patent.

Furthermore, assuming for the sake of argument that the above-quoted passage was meant by Rostoker to provide a definition for the term "appropriate accelerating potentials," this passage still fails to disclose the recitation of claim 1 wherein the "controller provides a first voltage to the first [gate] electrode and a second opposite voltage to the second [gate] electrode."

Each of the rejected dependent claims recites a further specific combination of features, which will be appreciated, is simply not disclosed by Rostoker.

For at least these reasons, it is respectfully submitted that the present rejection of claim 1 and claims 2-3, 9-10, and 26-27 dependent therefrom, be reversed.

2. Rostoker Fails to Disclose the Combination of Traveling Wave Grid and Gate Configuration of Claims 1-3, 9-10, and 26-27

Furthermore, Rostoker fails to disclose a system as recited in claim 1 that comprises a combination of a traveling wave grid and a gate configuration in which opposite voltages are applied to electrodes of the gate.

The schematic arrangements in Figs. 6a-6c of Rostoker merely illustrate substrates with one or more apertures through which particles may be selectively passed. Rostoker fails to disclose a system for transporting and selectively sorting particles comprising in part, the combination of a plurality of walls with a traveling wave grid and a gate having two electrodes spaced from one another, and a controller which, in addition to providing a multi-phase electrical signal to the traveling wave grid and the two electrodes of the gate, also provides two opposite voltages to the gate electrodes.

"To anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim" *Brown v. 3M*, 265 F.3d 1349, 60 USPQ2d 1375 (Fed. Cir. 2001). Rostoker fails to disclose the particular arrangement of system components as recited in claim 1. It is respectfully submitted that upon further review, the Board will appreciate that the '389 patent fails to disclose the subject matter of independent claim 1.

Since claim 1 is allowable over the limited disclosure of the '389 patent to Rostoker, so, too, are claims 2-3 and 9-10 dependent therefrom.

In addition, each of the rejected dependent claims recites a further specific combination of features, which will be appreciated, is simply not disclosed by Rostoker.

3. Rostoker Fails to Disclose the Combination of Multiple Transport Channels and Gate Configuration between the Channels of Claims 11 and 19-20

Independent claim 11 recites a system comprising, in part, two transport channels and a gate and gating passage between the transport channels. Rostoker fails to disclose this particular configuration. Specifically, Rostoker entirely fails to disclose a system as recited in independent claim 11 comprising a housing with a collection of walls that define first and second transport channels and a gate providing communication between the transport channels. Although Rostoker arguably discloses multiple conveyors in Figs. 7a and 7b, Rostoker fails to disclose any type of gate between those conveyors which provides communication between the conveyors. It would be inappropriate to construe the "mixing site" of Fig. 7b of the '389 patent as a gate.

For at least these reasons, it is submitted that the present rejection of claims 11 and 19-20 dependent therefrom be reversed.

Furthermore, each of the rejected dependent claims recites a further specific combination of features, which will be appreciated, is simply not disclosed by Rostoker.

4. Rostoker Fails to Disclose the Combination of Multiple Transport Channels, Gate Configuration and Gate Electrodes of Claims 11 and 19-20

Claim 11 expressly recites in further combination with the two transport channels, that the gate includes a first electrode proximate the first transport channel and a second electrode proximate the second transport channel, and that these electrodes are in electrical communication with the recited voltage source. Rostoker fails to disclose a system that comprises a combination of two transport channels, the particular gate configuration, and multiple gate electrodes.

Again, the Board is respectfully reminded of the requirement for anticipation – “A single reference must describe the claimed invention with sufficient precision and detail to establish that the subject matter existed in the prior art.” *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 65 USPQ2d 1051 (Fed. Cir. 2002). Rostoker simply fails to provide such a disclosure. For at least these reasons, it is submitted that independent claim 11 is allowable over the patent to Rostoker. Claims 19-20 depend from claim 11 and so, these claims contain all of the recitations of claim 11 and thus are also in condition for allowance.

Moreover, each of the rejected dependent claims recites a further specific combination of features, which will be appreciated, is simply not disclosed by Rostoker.

5. Rostoker Fails to Disclose Method Using the Combination of Two Chambers and Multiple Electrode Gate of Claims 23 and 25

Independent claim 23 recites, in part, a method of transporting and selectively sorting particles by providing a particular recited system, introducing a quantity of particles into a first chamber of the system, applying a multi-phase electrical signal from a controller to thereby induce flow of the particles, and selectively gating a portion of the flowing particles by the controller outputting specified electrical signals to certain gating electrodes.

Specifically, claim 23 recites that the system defines two chambers and a multiple electrode gate between the chambers. The gate is recited as including first and second electrodes spaced apart from one another and disposed along a passage connecting the two chambers. The ‘389 patent to Rostoker fails to disclose a system that defines two chambers and the multiple electrode gate between the chambers, as recited in claim 23. As previously noted, although Rostoker arguably discloses multiple

conveyors in Figs. 7a and 7b, Rostoker fails to disclose any type of gate between those conveyors which provides communication between the conveyors.

For at least these reasons, it is submitted that the rejection of claim 23 and claim 25 dependent therefrom, be reversed.

Dependent claim 25 recites a further specific combination of features, which will be appreciated, is simply not disclosed by Rostoker.

6. Rostoker Fails to Disclose Method Using the Particular Recitations of Claims 23 and 25

Furthermore, Rostoker entirely fails to disclose a method as recited in claim 23 of introducing particles into a first chamber; applying a multi-phase electrical signal from a controller to a traveling wave grid to thereby induce a flow of particles in the first chamber; and selectively gating a portion of the particles flowing in the first chamber into a second chamber by the controller outputting a multi-phase electrical signal, in which a first phase is applied to the first gate electrode and the second phase is applied to the second gate electrode. "To anticipate a claim, a reference must disclose every element of the challenged claim." *PPG Industries, Inc. v. Guardian Industries Corp.*, 75 F.3d 1558, 37 USPQ2d 1618 (Fed. Cir. 1996). Rostoker fails to disclose "every element" of independent claim 23.

For at least these reasons, claim 23 and claim 25 dependent therefrom are allowable over the '389 patent to Rostoker.

As previously noted, dependent claim 25 recites a further specific combination of features, which will be appreciated, is simply not disclosed by Rostoker.

7. Rostoker Fails to Disclose System of Claims 33-36

Independent claim 33 recites a system comprising, in part, a housing that defines two transport channels and a gating passage between these channels, a first traveling

wave grid in the first channel, and a continuous particle supply apparatus in communication with the first channel. The particle supply apparatus includes a supply housing that defines a supply chamber and a second traveling wave grid in the supply chamber. The '389 patent to Rostoker entirely fails to disclose such a system. In particular, Rostoker fails to disclose a configuration of multiple transport channels with a gate extending between the channels.

Since independent claim 33 is allowable over Rostoker, so, too, are claims 34-36 dependent therefrom.

In addition, each of the rejected dependent claims recites a further specific combination of features, which will be appreciated, is simply not disclosed by Rostoker.

B. Rejection of Claims 3 and 9 Under §103(a) Must Be Reversed

Claims 3 and 9 are both dependent from independent claim 1. And so, each of these claims contains all of the recitations of previously addressed claim 1. These claims were rejected for allegedly being obvious over the '389 patent to Rostoker.

However, it is submitted, that upon closer review, it will be appreciated that these claims are allowable and non-obvious over Rostoker.

As previously explained, claim 1 recites, in part, a system comprising a first wall, a traveling wave grid extending along the wall, a second wall with a gated passage extending therethrough, in which the gate includes electrodes at each end of the passage. Claim 1 further recites a controller that outputs a multi-phase signal to the traveling wave grid and the gate electrodes. Moreover, claim 1 is directed to the previously discussed "bipolar voltage" strategy, and thus recites that the voltages applied to the gate electrodes are opposite from one another.

It is respectfully submitted that the most that Rostoker teaches in this regard pertains to Rostoker's Fig. 6a:

FIG. 6a is a cross-sectional view of an apparatus 600 for moving a particle through an aperture, according to the invention. A planar insulating substrate 620 is provided with a first conductive layer 610 on one side, and is provided with a second conductive layer 612 on an opposite side. An aperture 630 extends through the insulating substrate 620 and the two conductive layers 610 and 612. Evidently, an electrostatically charged particle near the aperture 630 can be accelerated (caused to move) through the aperture 630 by application of appropriate accelerating potentials to the two conductive layers 610 and 612.

Col. 9, lines 4-14 of the '389 patent.

This passage fails to teach the provision of a first voltage to a first electrode of the gate and a second opposite voltage to a second electrode of the gate. Rostoker's mention of "appropriate accelerating potentials" fails to teach the recited bipolar voltage configuration recited in claims 3 and 9. What does Rostoker mean by "appropriate accelerating potentials"? It is unknown.

The only explanation given in the '389 patent concerning the meaning of the term "appropriate accelerating potentials", is found in the description of Fig. 6b for a multi-aperture apparatus:

By applying appropriate accelerating and/or repelling potentials to the various discrete conducting areas (610a-f) an electrostatically charged particle can be caused to be propelled through a particular one of the apertures. For example, an accelerating potential can be applied relative to the aperture 630a while repelling potentials (or no potentials) are applied relative to all of the other apertures (630b-f) to cause particles (including liquids or gas) approaching the multi-aperture apparatus 640 to be propelled only through the aperture 630a (or to propel particles from a reservoir associated only with aperture 630a to be propelled through aperture 630a).

Col. 9, lines 32-43.

This passage fails to teach the recited provision of a first voltage to a first electrode of the gate and a second opposite voltage to a second electrode of the gate as recited in the claims at issue. "Even when obviousness is based on a single prior art

reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference." *B.F. Goodrich Co. v Aircraft Breaking Sys. Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996); *In re Kotzab*, 208 F.3d 1352, 54 USPQ2d 1308 (Fed. Cir. 2000). Rostoker fails to suggest or provide any motivation to modify the described technique of selectively energizing one of a collection of apertures, all defined along a common plane. Rostoker fails to provide any directions as to implementing a bi-polar voltage strategy for a gate having multiple, spaced-apart electrodes.

In fact, if one followed the teachings of the quoted passage immediately above, one would be motivated to adopt a multi-aperture gating configuration extending within a single plane. In this configuration, Rostoker selectively applies an "appropriate accelerating potential" to a single aperture and either no potential or a repelling potential to the other apertures within the plane. This strategy is very different from, and fails to teach, the system of the claims at issue in which a first voltage is applied to a first electrode of a gate and a second, opposite voltage is applied to a second electrode of the same gate.

Furthermore, the present rejection must be reversed due to Rostoker teaching away from the subject matter of claim 1 and claims 3 and 9 dependent therefrom. Instead of the gating configuration recited in claim 1 in which bipolar voltages are applied to two electrodes disposed at opposite ends of a passage, Rostoker teaches applying an electrical potential to a single aperture of interest, and other electrical potentials, or no potentials, being applied to other apertures in the same plane as the aperture of interest. An artisan, following the teachings of the '389 patent to Rostoker,

would not be motivated to design an entirely different gating configuration as recited in claim 1.

"A prima facie case of obviousness can be rebutted if the applicant...can show 'that the art in any material respect taught away' from the claimed invention." *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed. Cir. 1997) (quoting *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974)). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference...would be led in a direction divergent from the path that was taken by the applicant." *Tec Air, Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 1360, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999)." *In re Haruna*, 249 F.3d 1327, 58 USPQ 1517 (Fed. Cir. 2001).

Rostoker entirely fails to teach the bipolar voltage configuration and the combination of traveling wave grid and gate configuration previously explained with regard to claim 1. And, as explained, Rostoker actually teaches away from the subject matter of claim 1.

For at least these reasons, claims 3 and 9 are allowable over the '389 patent.

C. Rejection of Claims 21 and 22 Under §103(a) Must Be Reversed

These claims were rejected based upon the '389 patent to Rostoker in view of the '734 patent to Docoslis et al.

Claims 21-22 depend from previously discussed independent claim 11.

Independent claim 11 recites a system comprising, in part, two transport channels and a gate and gating passage between the transport channels. Rostoker fails to teach this particular configuration. Specifically, Rostoker entirely fails to teach a system as recited in independent claim 11 comprising a housing with a collection of

walls that define first and second transport channels and a gate providing communication between the transport channels.

Claim 11 expressly recites in further combination with the two transport channels, that the gate includes a first electrode proximate the first transport channel and a second electrode proximate the second transport channel, and that these electrodes are in electrical communication with the recited voltage source. Rostoker fails to teach a system that comprises a combination of two transport channels, the particular gate configuration, and multiple gate electrodes.

As previously explained, the '389 patent to Rostoker fails to teach a system having at least two transport channels and a gate and gating passage between the transport channels. Furthermore, Rostoker fails to teach that the gate includes a first electrode proximate the first transport channel and a second electrode proximate the second transport channel, and that these electrodes are in electrical communication with the recited voltage source. "It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor." *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 15 USPQ2d 1321 (Fed. Cir. 1990), cert denied, 498 U.S. 920 (1990).

The '734 patent to Docoslis et al. fails to remedy the deficiencies of the '389 patent to Rostoker. Specifically, Docoslis et al. entirely fails to teach or even suggest a system having at least two transport channels and a gate and gating passage between the transport channels. Moreover, Docoslis et al. fail to teach or suggest that the gate includes a first electrode proximate the first transport channel and a second electrode

proximate the second transport channel, and that these electrodes are in electrical communication with the recited voltage source.

For at least these reasons, claims 21-22 dependent from independent claim 11, are non-obvious and patentable over the '389 patent to Rostoker and the '734 patent to Docoslis et al.

**CONCLUSION**

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1-3, 9-11, 19-23, 25-27, and 33-36 are in condition for allowance. For all of the above reasons, Appellants respectfully request this Honorable Board to reverse the rejections of claims 1-3, 9-11, 19-23, 25-27, and 33-36.

Respectfully submitted,



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APPENDICES

VIII. CLAIMS APPENDIX

Claims involved in the Appeal are as follows:

1. A system for transporting and selectively sorting particles comprising:
  - a first wall and a traveling wave grid extending along said first wall;
  - a second wall having a passage extending therethrough, said passage having a first end and a second end;
  - a gate operatively associated with said passage, said gate including a first electrode proximate said first end and a second electrode proximate said second end; and,
    - a controller adapted to output a multi-phase electrical signal and in electrical communication with said traveling wave grid and said first and second electrodes of said gate, wherein the controller provides a first voltage to said first electrode and a second opposite voltage to said second electrode.
2. The system of claim 1, wherein said passage is comprised of a plurality of apertures extending through said second wall.
3. The system of claim 2, wherein said plurality of apertures are substantially cylindrical and have a diameter of from about 10  $\mu\text{m}$  to about 250  $\mu\text{m}$ .
9. The system of claim 1, wherein said traveling wave grid is a first traveling wave grid and said system further comprises a second traveling wave grid extending along said second wall.

10. The system of claim 1, wherein said first wall is substantially cylindrical.
11. A system for transporting and selectively sorting particles comprising:
  - a housing having a first wall at least partially defining a first transport channel, a second wall at least partially defining a second transport channel, and a gating passage extending in fluid communication between said first and said second transport channels;
  - a traveling wave grid disposed along said first wall;
  - a gate operatively associated with said gating passage, said gate including a first electrode proximate the first transport channel and a second electrode proximate the second transport channel; and,
  - a voltage source adapted to output a multi-phase voltage signal and in electrical communication with said traveling wave grid and said first and second electrodes of said gate.
19. The system of claim 11, wherein said traveling wave grid includes four conductor groups, each having a plurality of conductors, said conductor groups disposed in an inter-digitized pattern.
20. The system of claim 19, wherein said voltage source outputs a four phase voltage signal, and each of said four phases is applied to a different one of said conductor groups.

21. The system of claim 11, wherein said traveling wave grid is a first traveling wave grid and said gating passage is a first gating passage, said housing further includes a third wall at least partially defining a third transport channel and a second gating passage extending in fluid communication between said second and said third transport channels, and said system further includes a second traveling wave grid extending along said second wall.

22. The system of claim 21, wherein said gate is a first gate, and said system further includes a second gate operatively associated with said second gating passage.

23. A method of transporting and selectively sorting particles, said method comprising the steps of:

providing a first wall at least partially forming a first chamber, a second wall at least partially forming a second chamber, a passage wall at least partially defining a passage extending in fluid communication between said first and second chambers, a traveling wave grid disposed along said first wall, a gate operatively associated with said passage, said gate including first and second spaced apart electrodes disposed along said passage, and a controller adapted to selectively output a multi-phase electrical signal and in electrical communication with said traveling wave grid and said gate;

introducing a quantity of separable particles into said first chamber;

applying a multi-phase electrical signal from said controller across at least a portion of said traveling wave grid inducing flow of said quantity of separable particles along said first chamber; and,

selectively gating a portion of said quantity of separable particles flowing along said first chamber into said second chamber by said controller outputting an electrical signal having first and second phases, and applying said first phase to said first electrode of said gate and applying said second phase to said second electrode of said gate.

25. The method of claim 23, wherein said step of providing includes providing a continuous particle supply apparatus in fluid communication with said first chamber, and said step of introducing a quantity of separable particles includes introducing a continuous quantity of separable particles from said supply apparatus.

26. The system of claim 1 wherein the first voltage is a positive voltage and the second voltage is a negative voltage.

27. The system of claim 1 wherein the first and second voltages are 180 degrees out of phase.

33. A system for transporting and selectively sorting particles comprising:  
a housing having a first wall at least partially defining a first transport channel, a second wall at least partially defining a second transport channel, and a gating passage extending in fluid communication between said first and said second transport channels;  
a first traveling wave grid disposed along said first wall;  
a gate operatively associated with said gating passage;

a continuous particle supply apparatus in fluid communication with said first transport channel, said supply apparatus including a supply housing at least partially defining a supply chamber, and a second traveling wave grid disposed within said supply chamber; and

a voltage source adapted to output a multi-phase voltage signal and in electrical communication with said first and said second traveling wave grid and said gate.

34. The system of claim 33, wherein said supply apparatus further includes a support wall supported within said supply chamber and said second traveling wave grid extends along at least a portion of said support wall.

35. The system of claim 34 wherein said support wall is generally cylindrical.

36. The system of claim 33 wherein said gating passage is a first gating passage, and said supply apparatus is in fluid communication with said first transport channel through a second gating passage extending between said supply chamber and said first transport channel.

IX. EVIDENCE APPENDIX

NONE

X. RELATED PROCEEDINGS APPENDIX

NONE